

Condensed Matter Physics

OPTICAL PROPERTIES OF A GaInNAs MUTLI-QUANTUM WELL

SEMICONDUCTOR

Timothy S. Hughes, Dr. Shang-Fen Ren*, Dr. De-Sheng Jiang, Liang Xiaogan

Department of Physics

Illinois State University

Campus Box 4560

Normal, IL 61761-4560

Email: thughes1@uiuc.edu

Abstract

Optoelectronic devices used today depend on lasers that have wavelengths in the optical fiber transmission widow of 1.3 to 1.55 micrometers. When using GaAs substrate semiconductors, we typically see the range of light emission. Quaternary materials, such as GaInNAs grown on the substrate, not only allow us to control the output wavelength, but they also allow us to manipulate the lattice constant. Further research has potential to produce low-costing highly efficient Vertical Cavity Surface Emitting Lasers (VCSEL). Using a Fourier-Transform, a method of using a Michelson Interferometer to measure the interference between two coherent beams, we measured and analyzed the photoluminescence spectra of a GaInNAs multi-quantum well semiconductor, grown using the Molecular Beam Epitaxy (MBE) growth technique. The experiments of this research were carried out in an undergraduate international research experience at the Chinese Semiconductor Institute supported by the Division of International Programs of NSF.